SCIENCE ACTIVATION STATUS

Astrophysics Meeting of Experts
June 30, 2021

Kristen Erickson, Director
Science Engagement & Partnerships

Active participation in the advancement of knowledge

https://science.nasa.gov/learners

Science Activation Across the Nation

By the Numbers. COVID Edition*

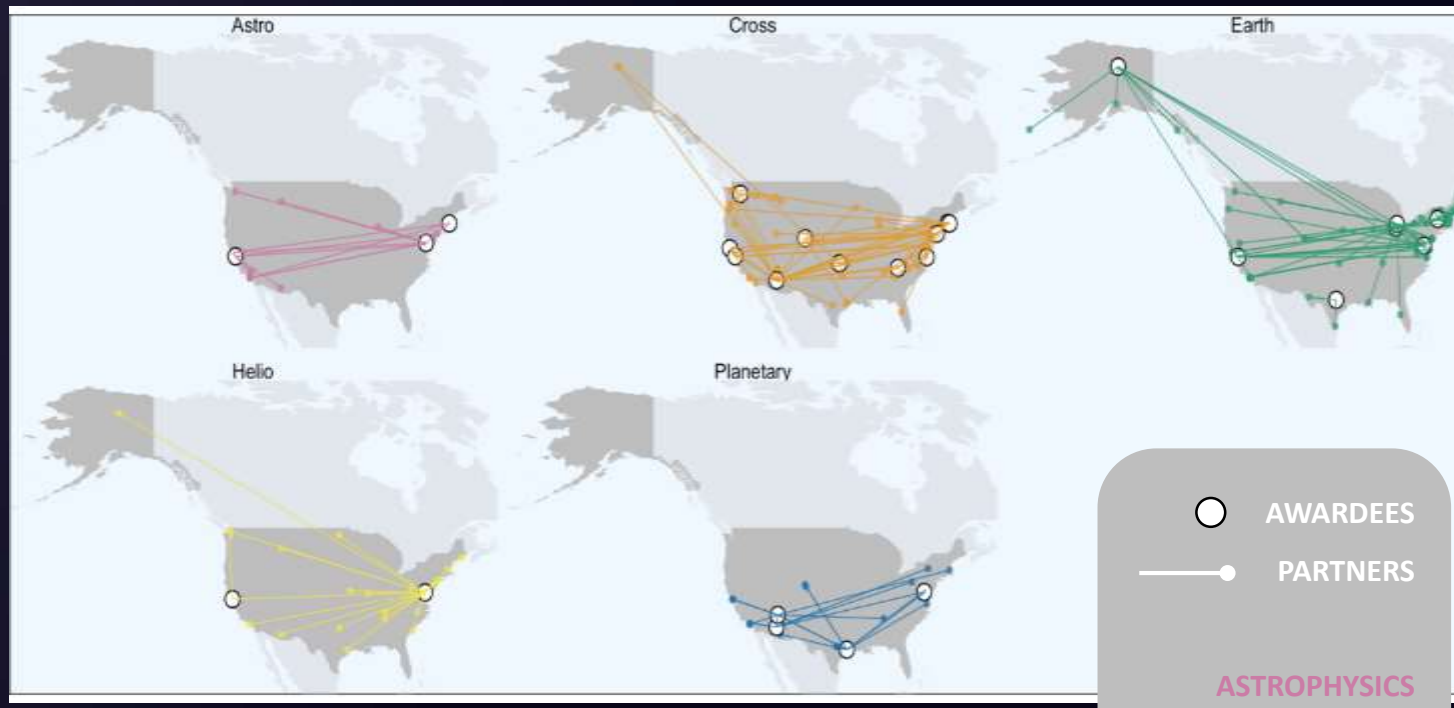
23 million
Learners reached world-wide!
112 countries, 22 million in the U.S.

72 peer-reviewed publications

350 hands-on toolkits developed and distributed to science centers and museums

421 subject matter experts ensure accurate and timely science content

43 teams including 1100 volunteers hosting over 50,000 events since 2016

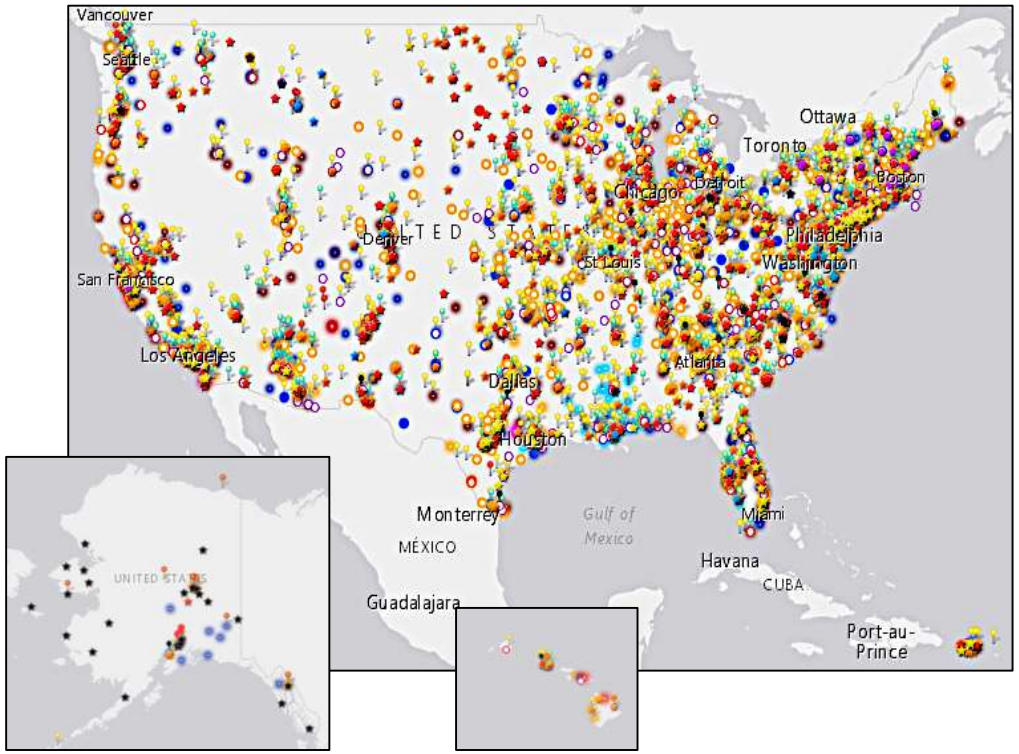


268 leveraged partnerships
20% increase since 2016

* Through 2020

Science Activation (SciAct)

Reaching Learners of All Ages Across the Nation in the Active Participation in of Advancing Knowledge



Strategic Objective - Enable NASA science experts and content to engage more effectively and efficiently with learners of all ages

Major Activities

- Each award has independent evaluator and program has new portfolio-level independent evaluation team
  - 9 projects (1/3 of portfolio) with a Broadening Participation focus:
    - Native American nations in Oklahoma and Alaska
    - Undergraduate students at Historically Black Colleges and Universities
    - Learners on the Autism Spectrum
    - People who are blind or have low vision
    - Community college students
  - 9 projects with a Climate, Earth systems, and/or Earth data focus
  - 8 projects with a space science focus
  - 4 projects focused on Subject Matter Expert (SME) engagement

https://science.nasa.gov/learners
https://science.nasa.gov/citizenscience

SciAct Validated!

Accomplishments

- In 2019, NASEM conducted an assessment to help inform the next phase (SciAct 2.0) of the 10-year program, including the identification of any gaps. Identified 14 findings and 7 recommendations.
- 2020-2021 Progress on NASEM Recommendations - All Green!
- Strengthened coherence with Office of STEM Engagement activities (co-fund Artemis Essays, 3 EPSCOR, 3 Space Grant, 11 student interns)
- Dept of Energy, Albert Einstein Educator Fellows:
  - Created curriculum for HBCU/Shaw University and broader undergraduate level
  - Developed 3D Thursdays monthly webinars for Rural educators

Citizen Science Activated!

Accomplishments

- 191 citizen scientists are named coauthors on refereed publications
- Issued 23 new Citizen Science selections (Four in Astro)
- Held bi-monthly virtual workshops with professional scientists and the broader citizen science community since Spring 2020
- Convened 2-day CitSciCon first-of-its-kind online event series
  - invited everyone, everywhere
  - discover fun and important ways to help NASA do authentic research with citizen science projects
- See more at https://science.nasa.gov/citizenscience

Science Activation - Proven Return on Investment!

What's New

- FY 2022 Request includes an additional $10M/year to issue competitive awards towards combating social inequities
  - Community-based new and augmented awards selected in 2021. Includes $1M/year for new citizen science efforts. Leverages partnerships and celestial events
  - Changing Climate - Climate change already impacts entire townships and industries in the Arctic and in the Gulf of Maine; new funding will expand workshops in Alaska and the upper NE region
  - 2023 Annular Solar Eclipse – 10/14/2023 (bottom swath) – Known as a "ring of fire" eclipse, much of the path covers areas from the NW to the Gulf of Mexico. SciAct already has materials in English and Spanish. New funding expands the "Ciencia Initiative" and targets Hispanic-serving institutions to co-create materials to combat the fear and myths seen around the 2017 eclipse
  - If funded, awards issued early FY 2022 based on ROSES-21 process

SciAct Baseline includes Bringing the Webb Telescope to Communities Across the U.S

Early Expressions of Interest in the United States – Final list before launch!

Science Division Leads

Astrophysics: Dr. Hashima Hasan

Biological and Physical Sciences: Dr. Egle Cekanaviciute (ARC)

Earth: Dr. Trena Ferrell (GSFC)

Heliophysics: Dr. Kelly Korreck

Planetary Sciences: Dr. Michael Kelley

Progress on 2019 NASEM Recommendations – All Green!

Status on Recommendations:

1) and 2) PI Workshops at Nov. 2020 Meeting, and quarterly. Continuing work with NASEM. Identification of Mid-level Objectives

3) Award to MIT Media Lab

4) and 5) 1/3 Portfolio, including,ROSES-20 5 new awards

6) ROSES-20 4 new awards. ROSES-21 Pending

7) Independent Portfolio Evaluation - Awarded to Pacific Research & Evaluation, LLC. Evaluation Plan due July 2021

NASEM Recommendations
1. NASA SciAct should go through a **visioning process** that brings the portfolio up to date with current research on learning and design, the new Federal STEM plan, and evidence-based approaches to broadening participation. This process should also consider how SciAct fits within and contributes to the larger STEM education ecosystem, and should provide the foundation for developing actionable and measurable portfolio goals.
2. SciAct should articulate how it expects that the portfolio will leverage NASA assets, how partnerships and networks will be built, and how these actions will lead to desired, **measurable outcomes**.
3. SciAct must consider whether the development of a **coordinated learning network** of awardees across its portfolio is a program priority. If it is a priority, then the program must provide the necessary infrastructure to support a more active network of projects. At the very least, SciAct needs to develop more systematic mechanisms for projects to share best practices and learn from successes and failure.
4. SciAct should use the opportunity provided by Phase Two to reflect on the current portfolio within the context of the new vision, goals and logic model. This process should **critically review and guide existing projects, be explicit about the rationale and criteria for including new projects**, and consider how best to integrate them into the existing portfolio. One important area for consideration is how to ensure that **underserved communities** receive more focused attention in the next phase of the program.
5. SciAct should deepen its commitment to **broadening participation** by using evaluation measures that go beyond counting numbers of individuals who represent specific groups. In order to do this, SciAct must identify ways that the portfolio as a whole could draw upon and implement evidence-based strategies for broadening participation.
6. SciAct should build ongoing opportunities for **dialogue with NASA Science Mission Directorate's missions and scientists.**
7. SciAct should create an **independent mechanism to obtain ongoing, real time advice** from individuals with expertise in learning and design, the larger policy context of STEM education, partnering with local communities, broadening participation in STEM, and science content relevant to the missions of NASA's Science Mission Directorate. Among other responsibilities, these experts should inform the new visioning and planning process.
7a. With input from these experts, SciAct should consider whether and how a **portfolio-level evaluation** could strengthen the focus of the program and ensure that projects in the portfolio are effectively meeting overarching SciAct program goals and objectives.

Science Activation Desired Outcome/Vision Statement:

*To further enable **NASA science experts and content** into the learning environment more effectively and efficiently with learners of all ages.*

OBJECTIVES:	**Mid Level Objectives:**
Enable STEM Education	Inspire participants' interest in **STEM** and the development of their identities as science learners.
	Provide opportunities for participants to engage with the disciplinary content related to **NASA science and engineering.**
	Increase number of and frequency with which **NASA SMD assets** are used by learners across the US.
Improve U.S. Scientific Literacy	Advance participants' understanding of science and its processes using **NASA SMD assets**.
Advance National Education Goals	Increase participation in learner-centered experiences based on **NASA SMD assets.**
	Increase the diversity of participants reached by **Science Activation** through intentional, inclusive programming.
	Engage participants in learning experiences that promote development of skills for **STEM** careers.
Leverage Efforts through Partnerships	Leverage internal mechanisms to support sharing and learning across the **Science Activation** portfolio.
	Utilize external partners to leverage reach and effectiveness of the **Science Activation** portfolio.

NASA SMD assets = science content and data, space and airborne platforms, and scientific and technical personnel.

SciAct 2.0 Focused on Broadening Participation

1/3 of SciAct 2.0 portfolio to date reaches nontraditional audiences in innovative ways*

See Teams details at https://science.nasa.gov/learners

**Through ROSES-20 Awards*

Project	Institution	Short Description	Diverse Audience
Arctic and Earth SIGNS	University of Alaska - Fairbanks	Earth focus; braiding indigenous knowledge and western science	Alaska Natives
Eclipse Soundscapes: Citizen Science	ARISA Lab, LLC	Accessible opportunities for citizen scientists to participate in real and meaningful scientific research focusing on how eclipses affect life on Earth	Blind and low vision, as well as general public
NASA Community College Network	SETI Institute	An initiative to bring NASA science subject matter experts (SMEs) and NASA science resources into the classrooms of the nation's community college system	Community college students, often from under-served populations, or the first in their families to go to college
NASA's Neurodiversity Network	Sonoma State University	A pathway to NASA participation and STEM employment for neurodiverse learners	High school students on the autism spectrum
Native Earth | Native Sky	Oklahoma State University	Culturally-relevant earth-sky STEM programming for middle schoolers that will increase the students' understanding of and interest in STEM	Cherokee, Choctaw, and Chickasaw Nations of OK
Northwest Earth and Space Pipeline	University of Washington	A model network that can serve as a physical NASA educational presence in the Pacific Northwest, where there are no NASA centers	Rural, underserved and tribal communities
Planetary ReaCH	Lunar and Planetary Institute	Prepare planetary science SMEs to engage audiences within the Science Activation portfolio	Black and Latinx communities
PLANETS	Northern Arizona University	STEM units, each consisting of an engineering guide, a science guide, and educator resources	Dine Indigenous community, Physically disabled
STEM Enhancement in Earth Science	Texas Space Grant, UT-Austin	Earth Science high school online course and high school student internship program centered on NASA's Earth observing satellites	Diverse high school interns
Smoky Mountain STEM Collaborative	Southwestern Community College	A quality model for STEM engagement in rural, isolated regions throughout the nation, leveraging SMEs and science centers	Students of Appalachian heritage and Eastern Band of Cherokees
Student Airborne Science Activation	NASA Ames	Engaging students through NASA-related airborne campaigns; student geoscience learning ecosystem to enable effective student engagement with NASA SMEs, academic advisors, peers, and local communities	HBCU Undergraduate students

How to Enable Early Opportunities?

SciAct meets learner's needs from K to Grey

HIGH SCHOOL

- GL4HS: GeneLab for High School Students
- STEM Enhancement in Earth Science (SEES) High School Summer Intern Program

GRADUATE

- Future Investigators in NASA Earth & Space Science & Technology (FINESST)
- NASA Fellowship Activity
- NASA International Internships
- NASA Space Technology Graduate Research Opportunities
- National Space Grant College & Fellowship Project
- NASA Science Mission Design Schools
- Pathways Recent Grad Program

NASA SCIENCE CONTINUING OPPORTUNITIES

- NASA JPL/CalTech
- NASA Job Opportunities
- Presidential Management Fellows
- NASA's STAR Program

UNDERGRADUATE

- Blue Marble
- L'SPACE Academy
- Lunar and Planetary Science Summer Intern Program
- NASA Internships
- NASA International Internships
- Summer Program for Planetary Research
- Pathways Internship Program
- NASA Student Airborne Research Program (SARP)
- National Space Grant College & Fellowship Project
- Research Experience for Undergraduates (REU)
- Space Life Sciences Training Program (SLSTP)
- USRA Scholarship Awards

POSTDOCTORAL

- Jack Eddy Postdoctoral Fellowships
- NASA Astrobiology Institute (NAI) Postdoctoral Fellowship Program
- NASA Hubble Fellowship Program (NHFP)
- NASA Postdoctoral Program (NPP)
- Planetary Science Summer School
- Nancy Grace Roman Tech Fellowships (Astro)

https://science.nasa.gov/learners/learner-opportunities

Citizen Science

Dr. Marc Kuchner
SMD Citizen Science Officer

New Citizen Science (CitSci) Selections

NEW! Citizen Science Seed Funding Program (CSSFP) for incubating citizen science projects as they are being conceived or during critical transitions.

4 new awards in APD
4 new awards in HPD
1 new award in PSD

Citizen Science for Earth Systems (CSESP):
8 new awards including 7 prototype citizen science projects and one cit sci data analysis project.

EPSCOR:
4 new awards for assessing and qualifying Citizen Science Labeling for Training Data for GLOBE Observer Mosquito and Land Cover protocols.

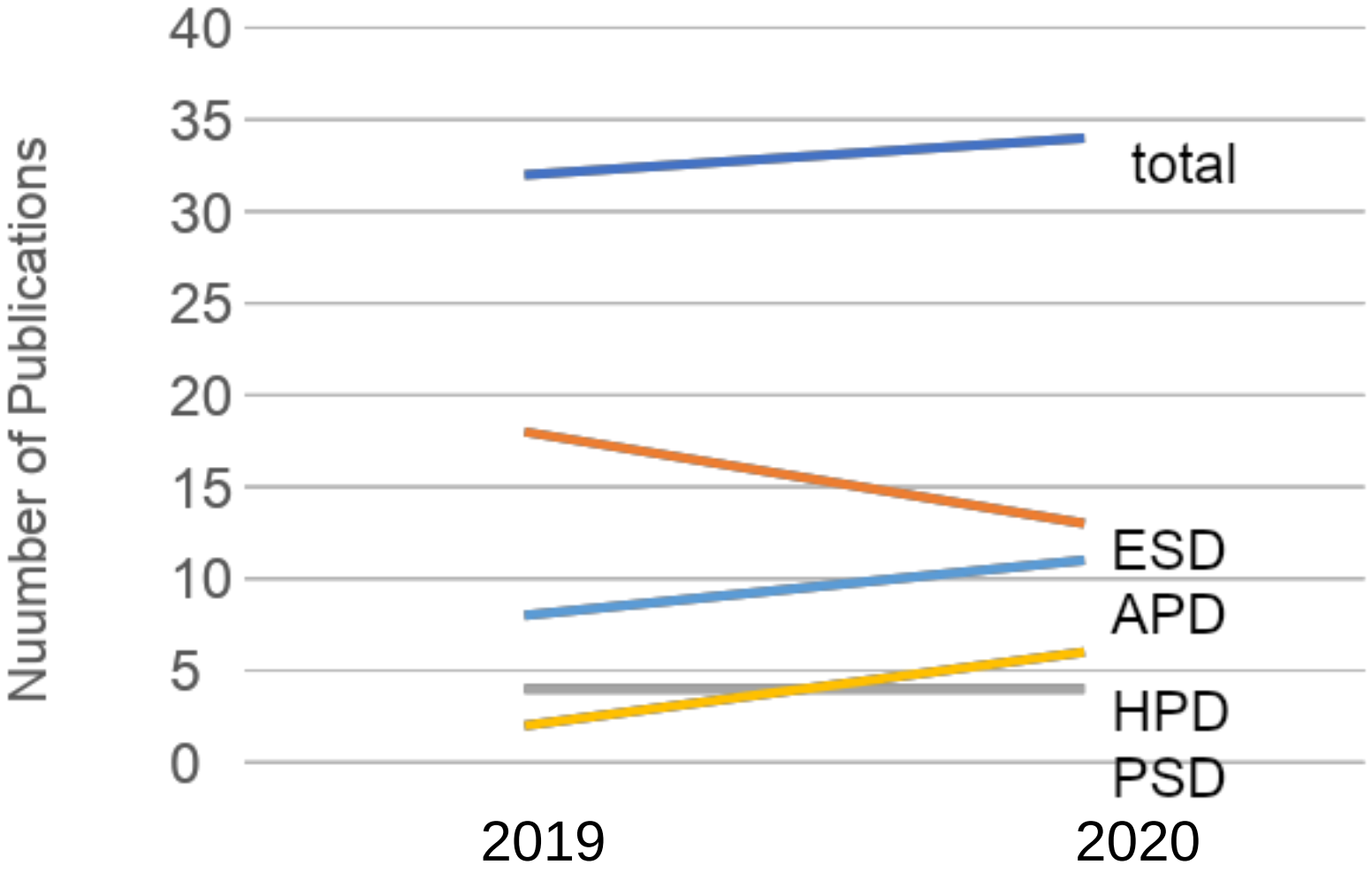
New NASA Policy Issued (NPD 1090.2)

- All NASA citizen science projects shall be designed and implemented to meet the **same rigorous standards as any NASA science** program…

- The **Chief Scientist** shall provide leadership, coordination, and Agency-level strategy for Agency citizen science activities as a whole.

Annual Division Reports on CitSci Plans

Publications in Peer-Reviewed Scientific Journals



And by the way, 191 NASA citizen scientists have become named co-authors on published papers since 2011!

Welcome Sarah Kirn (GMRI) CitSci Strategist

- Expanded remote role as the PI of our 2020 workshop series
- Leads workshops for NASA CitSci Practitioners (alternate Thursdays)

- Assists Citizen Science Officer with implementation of NASA SMD policy on SMD-funded Citizen Science (SPD-33)
- Created profiles of top NASA citizen scientists at science.nasa.gov
- Develops presentations, posters, and curricular materials for conferences
- Works with Zooniverse as a common platform

EXPLORE with us

Thank you for your time today!

https://science.nasa.gov/learners